

## Latin American Physicists Weigh In on Funding, Demographics, Potential

The article by José Luis Morán-López (PHYSICS TODAY, October 2000, page 38) points out the difficulties many Latin American physicists face. I congratulate the author for putting this situation into perspective.

Most physicists in Latin America have little career choice but to teach; for most, that is the only work they will ever do. Few have received research funding from abroad, and most of the very limited funding that is available has been targeted to specific research areas, at least here in Central America. Some have found other careers: Several of Panama's Internet administrators, and many of the academic community's Internet gurus, are physicists.

I must point out a small error. On page 39, Morán-López writes that the newest physical society in Latin America is "the Physical Society of Panama (founded in 1998)." This society was actually founded in 1980 with the purpose of hosting, for the first time in Panama, the tenth Central American and Caribbean School of Physics. The society soon vanished, partly because a new generation of physicists went abroad to pursue graduate studies. When these physicists returned to the region, however, several of them got together and reorganized the society. New officials were elected in 1998.

The society has had contact with other physical societies, with the Federation of Latin American Physical Societies (FELASOFI), and, during the 1998 American Physical Society Meeting in Atlanta, with APS officers. FELASOFI has provided support for the Physics Olympiad and various physics-related workshops.

However, another initiative mentioned in the article, the Latin American Physics Network (RELAIFI),

apparently is not working as well as expected. RELAFI, affiliated with other UNESCO science organizations, seems to have two problems that also exist in other scientific networks in the region: political arguments and distractions, and the desire of many scientists to look better than their colleagues. Prestige, either real or perceived, seems to be a commodity here. I hope this changes soon.

The article also mentioned funding for science and technology from the Inter-American Development Bank. Research seems to get a small fraction of IADB support here; the funds generally go to applied technology. One example is Project 2061 of the American Association for the Advancement of Science (AAAS), which has been adopted to improve mathematics and science teaching, but the effect of this program is still nearly microscopic. Other IADB support has gone only to the main national university, not to any private academic institution.

There are important physics-related issues in the region that deserve funding and support. Laser spectroscopy is a good example. Panama has no comprehensive real-time detection systems for air and water pollution. Laser spectroscopy could be used for basic physics at the same time it is used to track pollution, detect waste producers, analyze environmental degradation, and study weather patterns. Laser spectroscopy has been used successfully in "biological prospecting" to find new drugs. Also hyperspectral imaging-based dynamics could be used to trace possible sources for new drugs in the rainforest. Climatologists could investigate new locations for wind-power plants. In my country and perhaps in the region, these possibilities are not taken seriously. Even automobile traffic could be improved by the application of statistical physics.

The article mentions that the employment situation for physicists is good in Latin America. This may be so in Mexico, Brazil, and Argentina, but it is not entirely true in Central America. The major countries

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have strong programs to support science; they have the gross domestic product to fund it; the smaller countries don't. Moreover, the average physics professor has to hold down two teaching jobs: one in the state university in which she or he has tenure, and the other in a private university or high school. Some physics professors also look for temporary consulting jobs.

Science and technology indicators must be used cautiously in predicting what will happen to Latin American physics. Often, officials do not want their country to look bad in front of its neighbors, so they may report figures that are not well supported by reality.

What can be done? In the same way investment capital is put into Internet ventures without investors' seeking immediate return, associations like APS could take action by tapping funding and resources that could be channeled to the least-favored countries through society members living there, specifically to Honduras, Nicaragua, Panama (don't be fooled by economic figures), Belize, and Guatemala. Costa Rica epitomizes the goal the others need to reach: a general public respect for science and technology, including physics. Countries with few physicists (Panama only has about 15 PhDs) need the support of strong and continuing research-exchange programs; they also need funds, equipment, and updated reference works.

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I read with interest the article by José Luis Morán-López. He states that it is not complete; still, the newly released results of a study by Colciencias, the Colombian Science Foundation (<http://www.colciencias.gov.co>), necessitate a revision of Colombia's entry in the table on page 40.

Almost 750 research groups in all disciplines (natural, social, and applied sciences, and humanities) participated in the study. Sixty-nine of them were ranked in the highest category based on publications in international journals. Of these groups, 17 (one-quarter) work in

physics or related areas. Four universities—Antioquia, Valle, the Andes, and National—have at least three top-ranked physics groups each. Three others—Cauca, the Industrial University of Santander, and Quindío—have one group each.

Many of these research groups contribute to the early training of young scientists, who often publish their first papers while working with them, and many groups have long-term collaborations with major institutes or universities throughout the world. While the international effect of Colombian physics may be modest, the few hundred physics PhDs in this country have a significant impact on the local research community of about 4000 individuals.

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I enjoyed reading the article by José Luis Morán-López. However I do not agree with his starting assertion that "poor economic conditions in most Latin American countries have seriously restricted their capability to invest in science and technology." His whole article seems to suggest the opposite: Poor investments in science and technology in most Latin American countries have seriously restricted the capability of those countries to improve their economic conditions.

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MORÁN-LÓPEZ REPLIES: I thank Azael Barrera for pointing out that the Physical Society of Panama (PSP) was founded in 1980, not 1998. He also explains why the PSP was inactive for the intervening period. The PSP began operations in 1998, the date that I mistook as the founding date. At that time, I was acting president of the Federation of Latin American Physical Societies when the PSP requested affiliation. The PSP is the most recent society to become affiliated with FELASOFI.

Barrera suggests that political arguments and distractions, and the desire of many scientists to look better than their colleagues, are two reasons why the Latin American Physics Network (RELAFI) is not "working as well as expected." RELAFI is one of five Latin Ameri-

can science networks that are funded primarily through UNESCO. Unfortunately, UNESCO has restricted its financial support, and the networks' activities have been limited accordingly.

I appreciate Edgar G. Pavía's point of view since it raises an interesting question: Does the lack of investment in science and technology in some Latin American countries cause poor economic conditions, or is it the other way around? To promote higher levels of education and thus improve overall economic conditions, Latin American countries must first educate a seed group of scientists, who in turn will contribute to a general improvement in education. Such a seed group needs special conditions to flourish, perhaps the most important being strong initial funding of science and technology programs. However, that initial investment has been hindered by the poor economic conditions in some Latin American countries.

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## Global Science Teams Will Have to Share Resources and Glory

The recent announcement of an increase in government spending to allow the UK to join the European Southern Observatory (ESO; PHYSICS TODAY, January 2001, page 25) may well have sent a shudder through the US affiliates of the Association of Universities for Research in Astronomy. Is this announcement, following as it does proposals for a non-NATO European "rapid reaction" military force, another instance of growing isolationism between Europe and the US? Will it threaten the future of joint projects like the 8-meter Gemini telescopes, a collaborative effort of the US, UK, Canada, Australia, and South America? Actually, it underscores the need for greater cooperation, and is a clear signal that science is a global, rather than a national, pursuit.

During science funding difficulties, the cry is often raised of national pride and the need to spend money on research to beat the competition. The UK has long realized that it cannot afford to fund major astronomy projects by itself, and has worked in various partnerships. That experience